



SEQUENCE LISTING

<110> IUCHI, SATOSHI
KOBAYASHI, MASATOMO
SHINOZAKI, KAZUO

<120> TRANSGENIC PLANTS CARRYING NEOXANTHIN
CLEAVAGE ENZYME GENE

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<140> 09/758,269
<141> 2001-01-12

<150> JP 2001-003476
<151> 2001-01-11

<150> JP 2000-010056
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<170> PatentIn Ver. 2.1

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Lys Val Ile Lys Cys Thr Val Gln Ile Asp Val Thr Glu Leu Thr Lys
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aaa cgc caa tta ttt aca ccc aga acc acc gct act ccg ccg cag cat 192
Lys Arg Gln Leu Phe Thr Pro Arg Thr Thr Ala Thr Pro Pro Gln His
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Asn Pro Leu Arg Leu Asn Ile Phe Gln Lys Ala Ala Ala Ile Ala Ile
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ccc aaa acc gct gat cca cgt gtt cag att gcc ggg aat tat tcc ccg	336
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Leu	Asp	Ala	Ala	Glu	Gly	Phe	Leu	Val	Ser	His	Glu	Lys	Leu	His	Pro	
100								105					110			

ctt	cct	aaa	acg	gct	gat	cct	agt	gtt	cag	atc	gcc	gga	aat	ttt	gct	384
Leu	Pro	Lys	Thr	Ala	Asp	Pro	Ser	Val	Gln	Ile	Ala	Gly	Asn	Phe	Ala	
115								120					125			

ccg gtg aat gaa cag ccc gtc cggt aat ctt ccg gtg gtc gga aaa Pro Val Asn Glu Gln Pro Val Arg Arg Asn Leu Pro Val Val Gly Lys 130 135 140	432
ctt ccc gat tcc atc aaa gga gtg tat gtg cgc aac gga gct aac cca Leu Pro Asp Ser Ile Lys Gly Val Tyr Val Arg Asn Gly Ala Asn Pro 145 150 155 160	480
ctt cac gag ccg gtg aca ggt cac cac ttc ttc gac gga gac ggt atg Leu His Glu Pro Val Thr Gly His His Phe Phe Asp Gly Asp Gly Met 165 170 175	528
gtt cac gcc gtc aaa ttc gaa cac ggt tca gct agc tac gct tgc ccg Val His Ala Val Lys Phe Glu His Gly Ser Ala Ser Tyr Ala Cys Arg 180 185 190	576
ttt act cag act aac ccg ttt gtt cag gaa cgt caa ttg ggt cga ccg Phe Thr Gln Thr Asn Arg Phe Val Gln Glu Arg Gln Leu Gly Arg Pro 195 200 205	624
gtt ttc ccc aaa gcc atc ggt gag ctt cac ggc cac acc ggt att gcc Val Phe Pro Lys Ala Ile Gly Glu Leu His Gly His Thr Gly Ile Ala 210 215 220	672
cga ctc atg cta ttc tac gcc aga gct gca gcc ggt ata gtc gac ccg Arg Leu Met Leu Phe Tyr Ala Arg Ala Ala Gly Ile Val Asp Pro 225 230 235 240	720
gca cac gga acc ggt gta gct aac gcc ggt ttg gtc tat ttc aat ggc Ala His Gly Thr Gly Val Ala Asn Ala Gly Leu Val Tyr Phe Asn Gly 245 250 255	768
cggtt aat ttg gct atg tcg gag gat gat tta cct tac caa gtt cag atc Arg Leu Leu Ala Met Ser Glu Asp Asp Leu Pro Tyr Gln Val Gln Ile 260 265 270	816
act ccc aat gga gat tta aaa acc gtt ggt ccg ttc gat ttt gat gga Thr Pro Asn Gly Asp Leu Lys Thr Val Gly Arg Phe Asp Phe Asp Gly 275 280 285	864
caa tta gaa tcc aca atg att gcc cac ccg aaa gtc gac ccg gaa tcc Gln Leu Glu Ser Thr Met Ile Ala His Pro Lys Val Asp Pro Glu Ser 290 295 300	912
ggt gaa ctc ttc gct tta agc tac gac gtc gtt tca aag cct tac cta Gly Glu Leu Phe Ala Leu Ser Tyr Asp Val Val Ser Lys Pro Tyr Leu 305 310 315 320	960
aaa tac ttc cga ttc tca ccg gac gga act aaa tca ccg gac gtc gag Lys Tyr Phe Arg Phe Ser Pro Asp Gly Thr Lys Ser Pro Asp Val Glu 325 330 335	1008
att cag ctt gat cag cca acg atg atg cac gat ttc gcg att aca gag Ile Gln Leu Asp Gln Pro Thr Met Met His Asp Phe Ala Ile Thr Glu 340 345 350	1056

aac ttc gtc gtc gta cct gac cag caa gtc gtt ttc aag ctg ccg gag		1104	
Asn Phe Val Val Val Pro Asp Gln Gln Val Val Phe Lys Leu Pro Glu			
355	360	365	
atg atc cgc ggt ggg tct ccg gtg gtt tac gac aag aac aag gtc gca		1152	
Met Ile Arg Gly Gly Ser Pro Val Val Tyr Asp Lys Asn Lys Val Ala			
370	375	380	
aga ttc ggg att tta gac aaa tac gcc gaa gat tca tcg aac att aag		1200	
Arg Phe Gly Ile Leu Asp Lys Tyr Ala Glu Asp Ser Ser Asn Ile Lys			
385	390	395	400
tgg att gat gct cca gat tgc ttc tgc ttc cat ctc tgg aac gct tgg		1248	
Trp Ile Asp Ala Pro Asp Cys Phe Cys Phe His Leu Trp Asn Ala Trp			
405	410	415	
gaa gag cca gaa aca gat gaa gtc gtc gtg ata ggg tcc tgt atg act		1296	
Glu Glu Pro Glu Thr Asp Glu Val Val Val Ile Gly Ser Cys Met Thr			
420	425	430	
cca cca gac tca att ttc aac gag tct gac gag aat ctc aag agt gtc		1344	
Pro Pro Asp Ser Ile Phe Asn Glu Ser Asp Glu Asn Leu Lys Ser Val			
435	440	445	
ctg tct gaa atc cgc ctg aat ctc aaa acc ggt gaa tca act cgc cgt		1392	
Leu Ser Glu Ile Arg Leu Asn Leu Lys Thr Gly Glu Ser Thr Arg Arg			
450	455	460	
ccg atc atc tcc aac gaa gat caa caa gtc aac ctc gaa gca ggg atg		1440	
Pro Ile Ile Ser Asn Glu Asp Gln Gln Val Asn Leu Glu Ala Gly Met			
465	470	475	480
gtc aac aga aac atg ctc ggc cgt aaa acc aaa ttc gct tac ttg gct		1488	
Val Asn Arg Asn Met Leu Gly Arg Lys Thr Lys Phe Ala Tyr Leu Ala			
485	490	495	
tta gcc gag ccg tgg cct aaa gtc tca gga ttc gct aaa gtt gat ctc		1536	
Leu Ala Glu Pro Trp Pro Lys Val Ser Gly Phe Ala Lys Val Asp Leu			
500	505	510	
act act gga gaa gtt aag aaa cat ctt tac ggc gat aac cgt tac gga		1584	
Thr Thr Gly Glu Val Lys Lys His Leu Tyr Gly Asp Asn Arg Tyr Gly			
515	520	525	
gga gag cct ctg ttt ctc ccc gga gaa gga gga gag gaa gac gaa gga		1632	
Gly Glu Pro Leu Phe Leu Pro Gly Glu Gly Glu Glu Asp Glu Gly			
530	535	540	
tac atc ctc tgt ttc gtt cac gac gag aag aca tgg aaa tcg gag tta		1680	
Tyr Ile Leu Cys Phe Val His Asp Glu Lys Thr Trp Lys Ser Glu Leu			
545	550	555	560
cag ata gtt aac gcc gtt agc tta gag gtt gaa gca acg gtt aaa ctt		1728	
Gln Ile Val Asn Ala Val Ser Leu Glu Val Glu Ala Thr Val Lys Leu			
565	570	575	

ccg tca agg gtt ccg tac gga ttt cac ggt aca ttc atc gga gcc gat 1776
 Pro Ser Arg Val Pro Tyr Gly Phe His Gly Thr Phe Ile Gly Ala Asp
 580 585 590

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 Asp Leu Ala Lys Gln Val Val
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 Gly Asn His Thr Gln Pro Pro Leu Ser Ser Ser Gln Ser Ser Asp Leu
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 Ser Tyr Cys Ser Ser Leu Pro Met Ala Ser Arg Val Thr Arg Lys Leu
 35 40 45

 Asn Val Ser Ser Ala Leu His Thr Pro Pro Ala Leu His Phe Pro Lys
 50 55 60

 Gln Ser Ser Asn Ser Pro Ala Ile Val Val Lys Pro Lys Ala Lys Glu
 65 70 75 80

 Ser Asn Thr Lys Gln Met Asn Leu Phe Gln Arg Ala Ala Ala Ala
 85 90 95

 Leu Asp Ala Ala Glu Gly Phe Leu Val Ser His Glu Lys Leu His Pro
 100 105 110

 Leu Pro Lys Thr Ala Asp Pro Ser Val Gln Ile Ala Gly Asn Phe Ala
 115 120 125

 Pro Val Asn Glu Gln Pro Val Arg Arg Asn Leu Pro Val Val Gly Lys
 130 135 140

 Leu Pro Asp Ser Ile Lys Gly Val Tyr Val Arg Asn Gly Ala Asn Pro
 145 150 155 160

 Leu His Glu Pro Val Thr Gly His His Phe Phe Asp Gly Asp Gly Met
 165 170 175

 Val His Ala Val Lys Phe Glu His Gly Ser Ala Ser Tyr Ala Cys Arg
 180 185 190

 Phe Thr Gln Thr Asn Arg Phe Val Gln Glu Arg Gln Leu Gly Arg Pro
 195 200 205

 Val Phe Pro Lys Ala Ile Gly Glu Leu His Gly His Thr Gly Ile Ala
 210 215 220

Arg Leu Met Leu Phe Tyr Ala Arg Ala Ala Ala Gly Ile Val Asp Pro
 225 230 235 240
 Ala His Gly Thr Gly Val Ala Asn Ala Gly Leu Val Tyr Phe Asn Gly
 245 250 255
 Arg Leu Leu Ala Met Ser Glu Asp Asp Leu Pro Tyr Gln Val Gln Ile
 260 265 270
 Thr Pro Asn Gly Asp Leu Lys Thr Val Gly Arg Phe Asp Phe Asp Gly
 275 280 285
 Gln Leu Glu Ser Thr Met Ile Ala His Pro Lys Val Asp Pro Glu Ser
 290 295 300
 Gly Glu Leu Phe Ala Leu Ser Tyr Asp Val Val Ser Lys Pro Tyr Leu
 305 310 315 320
 Lys Tyr Phe Arg Phe Ser Pro Asp Gly Thr Lys Ser Pro Asp Val Glu
 325 330 335
 Ile Gln Leu Asp Gln Pro Thr Met Met His Asp Phe Ala Ile Thr Glu
 340 345 350
 Asn Phe Val Val Val Pro Asp Gln Gln Val Val Phe Lys Leu Pro Glu
 355 360 365
 Met Ile Arg Gly Gly Ser Pro Val Val Tyr Asp Lys Asn Lys Val Ala
 370 375 380
 Arg Phe Gly Ile Leu Asp Lys Tyr Ala Glu Asp Ser Ser Asn Ile Lys
 385 390 395 400
 Trp Ile Asp Ala Pro Asp Cys Phe Cys Phe His Leu Trp Asn Ala Trp
 405 410 415
 Glu Glu Pro Glu Thr Asp Glu Val Val Val Ile Gly Ser Cys Met Thr
 420 425 430
 Pro Pro Asp Ser Ile Phe Asn Glu Ser Asp Glu Asn Leu Lys Ser Val
 435 440 445
 Leu Ser Glu Ile Arg Leu Asn Leu Lys Thr Gly Glu Ser Thr Arg Arg
 450 455 460
 Pro Ile Ile Ser Asn Glu Asp Gln Gln Val Asn Leu Glu Ala Gly Met
 465 470 475 480
 Val Asn Arg Asn Met Leu Gly Arg Lys Thr Lys Phe Ala Tyr Leu Ala
 485 490 495
 Leu Ala Glu Pro Trp Pro Lys Val Ser Gly Phe Ala Lys Val Asp Leu
 500 505 510
 Thr Thr Gly Glu Val Lys Lys His Leu Tyr Gly Asp Asn Arg Tyr Gly
 515 520 525

Gly Glu Pro Leu Phe Leu Pro Gly Glu Gly Gly Glu Glu Asp Glu Gly
 530 535 540

Tyr Ile Leu Cys Phe Val His Asp Glu Lys Thr Trp Lys Ser Glu Leu
 545 550 555 560

Gln Ile Val Asn Ala Val Ser Leu Glu Val Glu Ala Thr Val Lys Leu
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Pro Ser Arg Val Pro Tyr Gly Phe His Gly Thr Phe Ile Gly Ala Asp
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Asp Leu Ala Lys Gln Val Val
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<211> 1617

<212> DNA

<213> *Arabidopsis thaliana*

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aga ccc tcc aag ggt ttc tcc tcg aag ctt ctc gat ctt ctc gag aga 96
 Arg Pro Ser Lys Gly Phe Ser Ser Lys Leu Leu Asp Leu Leu Glu Arg
 20 25 30

ctt gtt gtc aag ctc atg cac gat gct tct ctc cct ctc cac tac ctc 144
 Leu Val Val Lys Leu Met His Asp Ala Ser Leu Pro Leu His Tyr Leu
 35 40 45

tca ggc aac ttc gct ccc atc cgt gat gaa act cct ccc gtc aag gat 192
 Ser Gly Asn Phe Ala Pro Ile Arg Asp Glu Thr Pro Pro Val Lys Asp
 50 55 60

ctc ccc gtc cat gga ttt ctt ccc gaa tgc ttg aat ggt gaa ttt gtg 240
 Leu Pro Val His Gly Phe Leu Pro Glu Cys Leu Asn Gly Glu Phe Val
 65 70 75 80

agg gtt ggt cca aac ccc aag ttt gat gct gtc gct gga tat cac tgg 288
 Arg Val Gly Pro Asn Pro Lys Phe Asp Ala Val Ala Gly Tyr His Trp
 85 90 95

ttt gat gga gat ggg atg att cat ggg gta cgc atc aaa gat ggg aaa 336
 Phe Asp Gly Asp Gly Met Ile His Gly Val Arg Ile Lys Asp Gly Lys
 100 105 110

gct act tat gtt tct cga tat gtt aag aca tca cgt ctt aag cag gaa 384
 Ala Thr Tyr Val Ser Arg Tyr Val Lys Thr Ser Arg Leu Lys Gln Glu
 115 120 125

gag ttc ttc gga gct gcc aaa ttc atg aag att ggt gac ctt aag ggg	432
Glu Phe Phe Gly Ala Ala Lys Phe Met Lys Ile Gly Asp Leu Lys Gly	
130 135 140	
ttt ttc gga ttg cta atg gtc aat gtc caa cag ctg aga acg aag ctc	480
Phe Phe Gly Leu Leu Met Val Asn Val Gln Gln Leu Arg Thr Lys Leu	
145 150 155 160	
aaa ata ttg gac aac act tat gga aat gga act gcc aat aca gca ctc	528
Lys Ile Leu Asp Asn Thr Tyr Gly Asn Gly Thr Ala Asn Thr Ala Leu	
165 170 175	
gta tat cac cat gga aaa ctt cta gca tta cag gag gca gat aag ccg	576
Val Tyr His His Gly Lys Leu Leu Ala Leu Gln Glu Ala Asp Lys Pro	
180 185 190	
tac gtc atc aaa gtt ttg gaa gat gga gac ctg caa act ctt ggt ata	624
Tyr Val Ile Lys Val Leu Glu Asp Gly Asp Leu Gln Thr Leu Gly Ile	
195 200 205	
ata gat tat gac aag aga ttg acc cac tcc ttc act gct cac cca aaa	672
Ile Asp Tyr Asp Lys Arg Leu Thr His Ser Phe Thr Ala His Pro Lys	
210 215 220	
gtt gac ccg gtt acg ggt gaa atg ttt aca ttc ggc tat tcg cat acg	720
Val Asp Pro Val Thr Gly Glu Met Phe Thr Phe Gly Tyr Ser His Thr	
225 230 235 240	
cca cct tat ctc aca tac aga gtt atc tcg aaa gat ggc att atg cat	768
Pro Pro Tyr Leu Thr Tyr Arg Val Ile Ser Lys Asp Gly Ile Met His	
245 250 255	
gac cca gtc cca att act ata tca gag cct atc atg atg cat gat ttt	816
Asp Pro Val Pro Ile Thr Ile Ser Glu Pro Ile Met Met His Asp Phe	
260 265 270	
gct att act gag act tat gca atc ttc atg gat ctt cct atg cac ttc	864
Ala Ile Thr Glu Thr Tyr Ala Ile Phe Met Asp Leu Pro Met His Phe	
275 280 285	
agg cca aag gaa atg gtg aaa gag aag aaa atg ata tac tca ttt gat	912
Arg Pro Lys Glu Met Val Lys Glu Lys Lys Met Ile Tyr Ser Phe Asp	
290 295 300	
ccc aca aaa aag gct cgt ttt ggt gtt ctt cca cgc tat gcc aag gat	960
Pro Thr Lys Lys Ala Arg Phe Gly Val Leu Pro Arg Tyr Ala Lys Asp	
305 310 315 320	
gaa ctt atg att aga tgg ttt gag ctt ccc aac tgc ttt att ttc cac	1008
Glu Leu Met Ile Arg Trp Phe Glu Leu Pro Asn Cys Phe Ile Phe His	
325 330 335	
aac gcc aat gct tgg gaa gaa gag gat gaa gtc gtc ctc atc act tgt	1056
Asn Ala Asn Ala Trp Glu Glu Asp Glu Val Val Leu Ile Thr Cys	
340 345 350	

cgt ctt gag aat cca gat ctt gac atg gtc agt ggg aaa gtaaaa gaa	1104
Arg Leu Glu Asn Pro Asp Leu Asp Met Val Ser Gly Lys Val Lys Glu	
355 360 365	
aaa ctc gaa aat ttt ggc aac gaa ctg tac gaa atg aga ttc aac atg	1152
Lys Leu Glu Asn Phe Gly Asn Glu Leu Tyr Glu Met Arg Phe Asn Met	
370 375 380	
aaa acg ggc tca gct tct caa aaa aca cta tcc gca tct gcg gtt gat	1200
Lys Thr Gly Ser Ala Ser Gln Lys Lys Leu Ser Ala Ser Ala Val Asp	
385 390 395 400	
ttc ccc aga atc aat gag tgc tac acc gga aag aaa cag aga tac gta	1248
Phe Pro Arg Ile Asn Glu Cys Tyr Thr Gly Lys Lys Gln Arg Tyr Val	
405 410 415	
tat gga aca att ctg gac agt atc gca aag gtt acc gga atc atc aag	1296
Tyr Gly Thr Ile Leu Asp Ser Ile Ala Lys Val Thr Gly Ile Ile Lys	
420 425 430	
ttt gat ctg cat gca gaa gct gag aca ggg aaa aga atg ctg gaa gta	1344
Phe Asp Leu His Ala Glu Ala Glu Thr Gly Lys Arg Met Leu Glu Val	
435 440 445	
gga ggt aat atc aaa gga ata tat gac ctg gga gaa ggc aga tat ggt	1392
Gly Gly Asn Ile Lys Gly Ile Tyr Asp Leu Gly Glu Gly Arg Tyr Gly	
450 455 460	
tca gag gct atc tat gtt ccg cgt gag aca gca gaa gaa gac gac ggt	1440
Ser Glu Ala Ile Tyr Val Pro Arg Glu Thr Ala Glu Glu Asp Asp Gly	
465 470 475 480	
tac ttg ata ttc ttt gtt cat gat gaa aac aca ggg aaa tca tgc gtg	1488
Tyr Leu Ile Phe Val His Asp Glu Asn Thr Gly Lys Ser Cys Val	
485 490 495	
act gtg ata gac gca aaa aca atg tcg gct gaa ccg gtg gca gtg gtg	1536
Thr Val Ile Asp Ala Lys Thr Met Ser Ala Glu Pro Val Ala Val Val	
500 505 510	
gag ctg ccg cac agg gtc cca tat ggc ttc cat gcc ttg ttt gtt aca	1584
Glu Leu Pro His Arg Val Pro Tyr Gly Phe His Ala Leu Phe Val Thr	
515 520 525	
gag gaa caa ctc cag gaa caa act ctt ata taa	1617
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Leu Val Val Lys Leu Met His Asp Ala Ser Leu Pro Leu His Tyr Leu
 35 40 45

Ser Gly Asn Phe Ala Pro Ile Arg Asp Glu Thr Pro Pro Val Lys Asp
 50 55 60

Leu Pro Val His Gly Phe Leu Pro Glu Cys Leu Asn Gly Glu Phe Val
 65 70 75 80

Arg Val Gly Pro Asn Pro Lys Phe Asp Ala Val Ala Gly Tyr His Trp
 85 90 95

Phe Asp Gly Asp Gly Met Ile His Gly Val Arg Ile Lys Asp Gly Lys
 100 105 110

Ala Thr Tyr Val Ser Arg Tyr Val Lys Thr Ser Arg Leu Lys Gln Glu
 115 120 125

Glu Phe Phe Gly Ala Ala Lys Phe Met Lys Ile Gly Asp Leu Lys Gly
 130 135 140

Phe Phe Gly Leu Leu Met Val Asn Val Gln Gln Leu Arg Thr Lys Leu
 145 150 155 160

Lys Ile Leu Asp Asn Thr Tyr Gly Asn Gly Thr Ala Asn Thr Ala Leu
 165 170 175

Val Tyr His His Gly Lys Leu Leu Ala Leu Gln Glu Ala Asp Lys Pro
 180 185 190

Tyr Val Ile Lys Val Leu Glu Asp Gly Asp Leu Gln Thr Leu Gly Ile
 195 200 205

Ile Asp Tyr Asp Lys Arg Leu Thr His Ser Phe Thr Ala His Pro Lys
 210 215 220

Val Asp Pro Val Thr Gly Glu Met Phe Thr Phe Gly Tyr Ser His Thr
 225 230 235 240

Pro Pro Tyr Leu Thr Tyr Arg Val Ile Ser Lys Asp Gly Ile Met His
 245 250 255

Asp Pro Val Pro Ile Thr Ile Ser Glu Pro Ile Met Met His Asp Phe
 260 265 270

Ala Ile Thr Glu Thr Tyr Ala Ile Phe Met Asp Leu Pro Met His Phe
 275 280 285

Arg Pro Lys Glu Met Val Lys Glu Lys Lys Met Ile Tyr Ser Phe Asp
 290 295 300

Pro Thr Lys Lys Ala Arg Phe Gly Val Leu Pro Arg Tyr Ala Lys Asp
 305 310 315 320

Glu Leu Met Ile Arg Trp Phe Glu Leu Pro Asn Cys Phe Ile Phe His
 325 330 335
 Asn Ala Asn Ala Trp Glu Glu Asp Glu Val Val Leu Ile Thr Cys
 340 345 350
 Arg Leu Glu Asn Pro Asp Leu Asp Met Val Ser Gly Lys Val Lys Glu
 355 360 365
 Lys Leu Glu Asn Phe Gly Asn Glu Leu Tyr Glu Met Arg Phe Asn Met
 370 375 380
 Lys Thr Gly Ser Ala Ser Gln Lys Lys Leu Ser Ala Ser Ala Val Asp
 385 390 395 400
 Phe Pro Arg Ile Asn Glu Cys Tyr Thr Gly Lys Lys Gln Arg Tyr Val
 405 410 415
 Tyr Gly Thr Ile Leu Asp Ser Ile Ala Lys Val Thr Gly Ile Ile Lys
 420 425 430
 Phe Asp Leu His Ala Glu Ala Glu Thr Gly Lys Arg Met Leu Glu Val
 435 440 445
 Gly Gly Asn Ile Lys Gly Ile Tyr Asp Leu Gly Glu Gly Arg Tyr Gly
 450 455 460
 Ser Glu Ala Ile Tyr Val Pro Arg Glu Thr Ala Glu Glu Asp Asp Gly
 465 470 475 480
 Tyr Leu Ile Phe Phe Val His Asp Glu Asn Thr Gly Lys Ser Cys Val
 485 490 495
 Thr Val Ile Asp Ala Lys Thr Met Ser Ala Glu Pro Val Ala Val Val
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cg tct cat tta ctt cca caa ccc aaa aat gca aat att tct cga cga	96
Arg Ser His Leu Leu Pro Gln Pro Lys Asn Ala Asn Ile Ser Arg Arg	
20 25 30	
att ctc att aac cct ttc aag ata ccg aca ctt cct gat ctc act tct	144
Ile Leu Ile Asn Pro Phe Lys Ile Pro Thr Leu Pro Asp Leu Thr Ser	
35 40 45	
ccg gtt ccg tca ccg gtt aag ctc aaa cca acg tat cca aac tta aac	192
Pro Val Pro Ser Pro Val Lys Leu Lys Pro Thr Tyr Pro Asn Leu Asn	
50 55 60	
ctt ctt cag aag cta gcg gct acg atg ctc gac aag att gag tcc tct	240
Leu Leu Gln Lys Leu Ala Ala Thr Met Leu Asp Lys Ile Glu Ser Ser	
65 70 75 80	
atc gtt att cct atg gag cag aat cgc ccg ctt cct aaa ccg acc gac	288
Ile Val Ile Pro Met Glu Gln Asn Arg Pro Leu Pro Lys Pro Thr Asp	
85 90 95	
ccg gcg gtt caa tta tca ggt aac ttc gct ccg gtt aat gaa tgt ccg	336
Pro Ala Val Gln Leu Ser Gly Asn Phe Ala Pro Val Asn Glu Cys Pro	
100 105 110	
gtt cag aac ggt tta gaa gtg gtt ggt cag att cct tct tgt cta aaa	384
Val Gln Asn Gly Leu Glu Val Val Gly Gln Ile Pro Ser Cys Leu Lys	
115 120 125	
gga gtt tac atc cgt aac ggt gca aac cct atg ttt ccg ccg tta gcc	432
Gly Val Tyr Ile Arg Asn Gly Ala Asn Pro Met Phe Pro Pro Leu Ala	
130 135 140	
gga cat cat tta ttt gac ggt gac gga atg att cac gcc gtt agt atc	480
Gly His His Leu Phe Asp Gly Asp Gly Met Ile His Ala Val Ser Ile	
145 150 155 160	
ggt ttt gat aac cag gtt agt tac agc tgc ccg tac act aaa aca aac	528
Gly Phe Asp Asn Gln Val Ser Tyr Ser Cys Arg Tyr Thr Lys Thr Asn	
165 170 175	
ccg ctt gtt caa gaa acc gcg ctt gga cga tcg gtt ttc cct aaa cca	576
Arg Leu Val Gln Glu Thr Ala Leu Gly Arg Ser Val Phe Pro Lys Pro	
180 185 190	
atc ggc gag ctt cac ggc cat tcc ggt cta gct cga ctc gct ctc ttc	624
Ile Gly Glu Leu His Gly His Ser Gly Leu Ala Arg Leu Ala Leu Phe	
195 200 205	
acg gct cga gct ggg atc ggt cta gtg gac ggg aca cgt ggc atg ggc	672
Thr Ala Arg Ala Gly Ile Gly Leu Val Asp Gly Thr Arg Gly Met Gly	
210 215 220	
gta gct aac gcc ggt gtg gtt ttc ttt aac ggc agg tta tta gcc atg	720
Val Ala Asn Ala Gly Val Val Phe Phe Asn Gly Arg Leu Leu Ala Met	
225 230 235 240	

tca gaa gat gat ctt cct tac caa gtg aag atc gac ggt caa gga gat	768		
Ser Glu Asp Asp Leu Pro Tyr Gln Val Lys Ile Asp Gly Gln Gly Asp			
245	250	255	
ctt gag acg atc gga cgg ttc gga ttc gat gac cag att gac tct tca	816		
Leu Glu Thr Ile Gly Arg Phe Gly Phe Asp Asp Gln Ile Asp Ser Ser			
260	265	270	
gtg ata gcg cat cct aag gtg gac gcg acc aca gga gat ctc cat aca	864		
Val Ile Ala His Pro Lys Val Asp Ala Thr Thr Gly Asp Leu His Thr			
275	280	285	
ctg agc tac aac gtt ttg aag aaa cct cat ctc agg tat ctt aaa ttc	912		
Leu Ser Tyr Asn Val Leu Lys Lys Pro His Leu Arg Tyr Leu Lys Phe			
290	295	300	
aac acg tgc ggg aaa aag aca cgt gac gtg gag atc acg ctc cct gaa	960		
Asn Thr Cys Gly Lys Lys Thr Arg Asp Val Glu Ile Thr Leu Pro Glu			
305	310	315	320
cca acg atg att cat gat ttc gcg ata acc gag aat ttt gtc gtt ata	1008		
Pro Thr Met Ile His Asp Phe Ala Ile Thr Glu Asn Phe Val Val Ile			
325	330	335	
ccg gat cag caa atg gta ttc aaa tta tcc gaa atg att cgg ggc ggg	1056		
Pro Asp Gln Gln Met Val Phe Lys Leu Ser Glu Met Ile Arg Gly Gly			
340	345	350	
tca ccc gtt atc tac gtt aaa gaa aaa atg gcg aga ttt gga gtt ttg	1104		
Ser Pro Val Ile Tyr Val Lys Glu Lys Met Ala Arg Phe Gly Val Leu			
355	360	365	
tca aag cag gat ctg acc ggg tcg gat ata aat tgg gtt gat gta ccg	1152		
Ser Lys Gln Asp Leu Thr Gly Ser Asp Ile Asn Trp Val Asp Val Pro			
370	375	380	
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Asp Cys Phe Cys Phe His Leu Trp Asn Ala Trp Glu Glu Arg Thr Glu			
385	390	395	400
gag gga gac cca gtt atc gtc gta atc ggg tca tgt atg agc cca ccc	1248		
Glu Gly Asp Pro Val Ile Val Val Ile Gly Ser Cys Met Ser Pro Pro			
405	410	415	
gac acg atc ttt agt gaa tca gga gaa cca acc cgg gtt gaa tta agt	1296		
Asp Thr Ile Phe Ser Glu Ser Gly Glu Pro Thr Arg Val Glu Leu Ser			
420	425	430	
gag atc cgg tta aac atg cgt aca aaa gaa tcg aac cgt aag gtt atc	1344		
Glu Ile Arg Leu Asn Met Arg Thr Lys Glu Ser Asn Arg Lys Val Ile			
435	440	445	
gta acc gga gtg aat tta gaa gcg ggt cac ata aac cgt agt tac gtg	1392		
Val Thr Gly Val Asn Leu Glu Ala Gly His Ile Asn Arg Ser Tyr Val			
450	455	460	

ggc	cg	aaa	agc	cag	ttc	gtt	tac	ata	gca	ata	gcc	gat	cct	tgg	ccc	1440
Gly	Arg	Lys	Ser	Gln	Phe	Val	Tyr	Ile	Ala	Ile	Ala	Asp	Pro	Trp	Pro	
465					470				475					480		
aaa	tgc	agt	ggc	att	g	c	a	g	t	a	aa	a	c	g	cc	1488
Lys	Cys	Ser	Gly	Ile	Ala	Lys	Val	Asp	Ile	Gln	Asn	Gly	Thr	Val	Ser	
				485				490					495			
gag	ttt	aat	tac	gga	ccg	agc	cg	ttc	gg	gaa	ccg	tg	ttt	gt		1536
Glu	Phe	Asn	Tyr	Gly	Pro	Ser	Arg	Phe	Gly	Gly	Glu	Pro	Cys	Phe	Val	
				500				505					510			
ccg	gag	gga	gaa	gga	gaa	gac	aaa	ggt	tat	gt	atg	gg	ttt	gt		1584
Pro	Glu	Gly	Gly	Gly	Glu	Glu	Asp	Lys	Gly	Tyr	Val	Met	Gly	Phe	Val	
				515				520					525			
aga	gac	gaa	gag	aaa	gac	gag	tcg	gag	ttt	gt	gt	gtc	gac	g		1632
Arg	Asp	Glu	Glu	Lys	Asp	Glu	Ser	Glu	Phe	Val	Val	Val	Asp	Ala	Thr	
				530				535					540			
gat	atg	aag	caa	gtc	gc	gc	gt	cg	tt	cc	gag	gg	ttt	gt		1680
Asp	Met	Lys	Gln	Val	Ala	Ala	Val	Arg	Leu	Pro	Glu	Arg	Val	Pro	Tyr	
				545				550					555		560	
gg	t	tc	ca	g	ac	tc	gt	ag	at	ca	g	aa	ca	gt		1728
Gly	Phe	His	Gly	Thr	Phe	Val	Ser	Glu	Asn	Gln	Leu	Lys	Glu	Gln	Val	
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Arg	Ser	His	Leu	Leu	Pro	Gln	Pro	Lys	Asn	Ala	Asn	Ile	Ser	Arg	Arg	
				20				25					30			
Ile	Leu	Ile	Asn	Pro	Phe	Lys	Ile	Pro	Thr	Leu	Pro	Asp	Leu	Thr	Ser	
				35				40					45			
Pro	Val	Pro	Ser	Pro	Val	Lys	Leu	Lys	Pro	Thr	Tyr	Pro	Asn	Leu	Asn	
				50				55					60			
Leu	Leu	Gln	Lys	Leu	Ala	Ala	Thr	Met	Leu	Asp	Lys	Ile	Glu	Ser	Ser	
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Ile	Val	Ile	Pro	Met	Glu	Gln	Asn	Arg	Pro	Leu	Pro	Lys	Pro	Thr	Asp	
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Pro	Ala	Val	Gln	Leu	Ser	Gly	Asn	Phe	Ala	Pro	Val	Asn	Glu	Cys	Pro	
				100				105					110			

Val Gln Asn Gly Leu Glu Val Val Gly Gln Ile Pro Ser Cys Leu Lys
 115 120 125

Gly Val Tyr Ile Arg Asn Gly Ala Asn Pro Met Phe Pro Pro Leu Ala
 130 135 140

Gly His His Leu Phe Asp Gly Asp Gly Met Ile His Ala Val Ser Ile
 145 150 155 160

Gly Phe Asp Asn Gln Val Ser Tyr Ser Cys Arg Tyr Thr Lys Thr Asn
 165 170 175

Arg Leu Val Gln Glu Thr Ala Leu Gly Arg Ser Val Phe Pro Lys Pro
 180 185 190

Ile Gly Glu Leu His Gly His Ser Gly Leu Ala Arg Leu Ala Leu Phe
 195 200 205

Thr Ala Arg Ala Gly Ile Gly Leu Val Asp Gly Thr Arg Gly Met Gly
 210 215 220

Val Ala Asn Ala Gly Val Val Phe Phe Asn Gly Arg Leu Leu Ala Met
 225 230 235 240

Ser Glu Asp Asp Leu Pro Tyr Gln Val Lys Ile Asp Gly Gln Gly Asp
 245 250 255

Leu Glu Thr Ile Gly Arg Phe Gly Phe Asp Asp Gln Ile Asp Ser Ser
 260 265 270

Val Ile Ala His Pro Lys Val Asp Ala Thr Thr Gly Asp Leu His Thr
 275 280 285

Leu Ser Tyr Asn Val Leu Lys Lys Pro His Leu Arg Tyr Leu Lys Phe
 290 295 300

Asn Thr Cys Gly Lys Lys Thr Arg Asp Val Glu Ile Thr Leu Pro Glu
 305 310 315 320

Pro Thr Met Ile His Asp Phe Ala Ile Thr Glu Asn Phe Val Val Ile
 325 330 335

Pro Asp Gln Gln Met Val Phe Lys Leu Ser Glu Met Ile Arg Gly Gly
 340 345 350

Ser Pro Val Ile Tyr Val Lys Glu Lys Met Ala Arg Phe Gly Val Leu
 355 360 365

Ser Lys Gln Asp Leu Thr Gly Ser Asp Ile Asn Trp Val Asp Val Pro
 370 375 380

Asp Cys Phe Cys Phe His Leu Trp Asn Ala Trp Glu Glu Arg Thr Glu
 385 390 395 400

Glu Gly Asp Pro Val Ile Val Val Ile Gly Ser Cys Met Ser Pro Pro
 405 410 415

Asp Thr Ile Phe Ser Glu Ser Gly Glu Pro Thr Arg Val Glu Leu Ser
 420 425 430

Glu Ile Arg Leu Asn Met Arg Thr Lys Glu Ser Asn Arg Lys Val Ile
 435 440 445

Val Thr Gly Val Asn Leu Glu Ala Gly His Ile Asn Arg Ser Tyr Val
 450 455 460

Gly Arg Lys Ser Gln Phe Val Tyr Ile Ala Ile Ala Asp Pro Trp Pro
 465 470 475 480

Lys Cys Ser Gly Ile Ala Lys Val Asp Ile Gln Asn Gly Thr Val Ser
 485 490 495

Glu Phe Asn Tyr Gly Pro Ser Arg Phe Gly Gly Glu Pro Cys Phe Val
 500 505 510

Pro Glu Gly Glu Gly Glu Glu Asp Lys Gly Tyr Val Met Gly Phe Val
 515 520 525

Arg Asp Glu Glu Lys Asp Glu Ser Glu Phe Val Val Val Asp Ala Thr
 530 535 540

Asp Met Lys Gln Val Ala Ala Val Arg Leu Pro Glu Arg Val Pro Tyr
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Gly Phe His Gly Thr Phe Val Ser Glu Asn Gln Leu Lys Glu Gln Val
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Phe

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ccc ccc ttc aaa gac cta cct tcc aca tct tct ccc aca aac tta ctt 96
 Pro Pro Phe Lys Asp Leu Pro Ser Thr Ser Ser Pro Thr Asn Leu Leu
 20 25 30

cct tta agg aaa aca tcc tct tcc aac acc atc aca tgt tcc ctt caa 144
 Pro Leu Arg Lys Thr Ser Ser Asn Thr Ile Thr Cys Ser Leu Gln
 35 40 45

aca ctc cac ttc ccc aaa cag tac caa cca aca tcc aca tcc aca tcc 192
 Thr Leu His Phe Pro Lys Gln Tyr Gln Pro Thr Ser Thr Ser Thr Ser
 50 55 60

aca gcc acc acc aca aca ccc acc cca atc aaa act acc acc atc acc	240
Thr Ala Thr Thr Thr Pro Thr Pro Ile Lys Thr Thr Thr Ile Thr	
65 70 75 80	
acc acc aca ccg ccc agg gaa acc aac cct ctc tct gac acc aac caa	288
Thr Thr Pro Pro Arg Glu Thr Asn Pro Leu Ser Asp Thr Asn Gln	
85 90 95	
cca tta cct caa aaa tgg aac ttt ctc cag aaa gcc gct gcc acg gcc	336
Pro Leu Pro Gln Lys Trp Asn Phe Leu Gln Lys Ala Ala Ala Thr Ala	
100 105 110	
ttg gac ctg gtc gaa acg gcg ctc gtc tcg cac gag cgc aaa cac ccg	384
Leu Asp Leu Val Glu Thr Ala Leu Val Ser His Glu Arg Lys His Pro	
115 120 125	
ctc ccc aaa acg gcg gac ccg agg gtc caa atc gcc ggg aac ttc gcg	432
Leu Pro Lys Thr Ala Asp Pro Arg Val Gln Ile Ala Gly Asn Phe Ala	
130 135 140	
ccg gtg ccg gag cat gcc gcg gat caa gga ctc ccg gtg gtc gga aaa	480
Pro Val Pro Glu His Ala Ala Asp Gln Gly Leu Pro Val Val Gly Lys	
145 150 155 160	
atc ccc aaa tgc att gac ggc gtg tac gtg cgc aac ggt gcc aat ccg	528
Ile Pro Lys Cys Ile Asp Gly Val Tyr Val Arg Asn Gly Ala Asn Pro	
165 170 175	
ctc tac gag cct gtg gcc ggg cac cac ttc ttc gac ggc gac ggc atg	576
Leu Tyr Glu Pro Val Ala Gly His His Phe Phe Asp Gly Asp Gly Met	
180 185 190	
gtc cac gcc gtg aag ttc acg aac ggc gcc agc tac gcc tgc cgc	624
Val His Ala Val Lys Phe Thr Asn Gly Ala Ala Ser Tyr Ala Cys Arg	
195 200 205	
ttc acc gag acg cag cgt ctc tcg cag gag aaa tct cta ggc cgc ccg	672
Phe Thr Glu Thr Gln Arg Leu Ser Gln Glu Lys Ser Leu Gly Arg Pro	
210 215 220	
gtg ttc ccg aag gcc atc ggg gag ctc cac ggc cac tcc ggc atc gcg	720
Val Phe Pro Lys Ala Ile Gly Glu Leu His Gly His Ser Gly Ile Ala	
225 230 235 240	
cgg ctc ctc ttc tac gcg cgc ggt ctc ttc ggg ctc gtt gat ggg	768
Arg Leu Leu Leu Phe Tyr Ala Arg Gly Leu Phe Gly Leu Val Asp Gly	
245 250 255	
tcc cag ggc atg ggc gtg gcg aac gcc ggt ctc gtc tac ttc aac aac	816
Ser Gln Gly Met Gly Val Ala Asn Ala Gly Leu Val Tyr Phe Asn Asn	
260 265 270	
cac ctc ttg gcc atg tcc gaa gac gat tta ccc tac cac gtg aga atc	864
His Leu Leu Ala Met Ser Glu Asp Asp Leu Pro Tyr His Val Arg Ile	
275 280 285	

acc cct aac ggc gac tta acc acc gtt ggc cgt tac gac ttc aac ggg		912	
Thr Pro Asn Gly Asp Leu Thr Thr Val Gly Arg Tyr Asp Phe Asn Gly			
290	295	300	
cag ctc aac tca aca atg atc gcc cac ccg aaa ctg gac ccc gtc gac		960	
Gln Leu Asn Ser Thr Met Ile Ala His Pro Lys Leu Asp Pro Val Asp			
305	310	315	320
ggc gac ctc cac gcg ctc agc tac gac gtc att cag aag cct tac ctc		1008	
Gly Asp Leu His Ala Leu Ser Tyr Asp Val Ile Gln Lys Pro Tyr Leu			
325	330	335	
aag tac ttc cgt ttc tcc ccc gac ggc gtc aag tcc ccc gac gtg gaa		1056	
Lys Tyr Phe Arg Phe Ser Pro Asp Gly Val Lys Ser Pro Asp Val Glu			
340	345	350	
atc ccc ctg aag gag ccc acc atg atg cac gat ttc gcc ata acg gag		1104	
Ile Pro Leu Lys Glu Pro Thr Met Met His Asp Phe Ala Ile Thr Glu			
355	360	365	
aat ttc gtc gtc gtc ccc gac cag cag gtg gtc ttc aaa cta acg gag		1152	
Asn Phe Val Val Val Pro Asp Gln Gln Val Val Phe Lys Leu Thr Glu			
370	375	380	
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Met Ile Thr Gly Gly Ser Pro Val Val Tyr Asp Lys Asn Lys Thr Ser			
385	390	395	400
cgg ttt ggg att ctg cac aag aat gcg aag gac gcg aat gcg atg cgg		1248	
Arg Phe Gly Ile Leu His Lys Asn Ala Lys Asp Ala Asn Ala Met Arg			
405	410	415	
tgg atc gac gcg ccg gat tgt ttc tgc ttc cac ctc tgg aac gcg tgg		1296	
Trp Ile Asp Ala Pro Asp Cys Phe Cys Phe His Leu Trp Asn Ala Trp			
420	425	430	
gag gag ccc gaa acc gag gag gtt gtg gtg att ggg tcc tgc atg acc		1344	
Glu Glu Pro Glu Thr Glu Glu Val Val Val Ile Gly Ser Cys Met Thr			
435	440	445	
cct gcg gac tcc att ttc aac gaa tgc gag gag agt ttg aag agc gtg		1392	
Pro Ala Asp Ser Ile Phe Asn Glu Cys Glu Ser Leu Lys Ser Val			
450	455	460	
ctg tca gag ata agg ctg aac ttg agg acc ggc aag tcc act cgg cgc		1440	
Leu Ser Glu Ile Arg Leu Asn Leu Arg Thr Gly Lys Ser Thr Arg Arg			
465	470	475	480
ccc att atc tcc gac gcc gaa caa gtg aac ctg gaa gcc ggc atg gtg		1488	
Pro Ile Ile Ser Asp Ala Glu Gln Val Asn Leu Glu Ala Gly Met Val			
485	490	495	
aac aga aac aag ctc gga agg aag acc cag ttc gcg tat ctg gct ctg		1536	
Asn Arg Asn Lys Leu Gly Arg Lys Thr Gln Phe Ala Tyr Leu Ala Leu			
500	505	510	

gag	ccc	tgg	ccc	aaa	gtc	tcg	ggc	ttt	gag	aaa	gtt	gat	ttg	ctg	1584	
Ala	Glu	Pro	Trp	Pro	Lys	Val	Ser	Gly	Phe	Ala	Lys	Val	Asp	Leu	Leu	
515						520					525					
agt	ggg	gaa	gtg	aag	aag	tac	atg	tat	gga	gaa	gag	aag	ttc	ggt	ggg	1632
Ser	Gly	Glu	Val	Lys	Lys	Tyr	Met	Tyr	Gly	Glu	Glu	Lys	Phe	Gly	Gly	
530					535					540						
gag	cct	ctg	ttt	ctt	ccc	aac	ggc	caa	aaa	gaa	gac	gat	ggg	tat	att	1680
Glu	Pro	Leu	Phe	Leu	Pro	Asn	Gly	Gln	Lys	Glu	Asp	Asp	Gly	Tyr	Ile	
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ctg	gca	tcc	gtg	cac	gac	gag	aaa	gaa	tgg	aaa	tcc	gag	ctg	cag	att	1728
Leu	Ala	Phe	Val	His	Asp	Glu	Lys	Glu	Trp	Lys	Ser	Glu	Leu	Gln	Ile	
565					570				575							
gtg	aat	gcc	caa	aat	tta	aag	ctc	gaa	gct	tcc	atc	aaa	ctc	ccc	tct	1776
Val	Asn	Ala	Gln	Asn	Leu	Lys	Leu	Glu	Ala	Ser	Ile	Lys	Leu	Pro	Ser	
580					585						590					
cgt	gtt	ccc	tac	ggt	ttt	cat	gga	act	ttc	att	cat	tcc	aag	gat	ttg	1824
Arg	Val	Pro	Tyr	Gly	Phe	His	Gly	Thr	Phe	Ile	His	Ser	Lys	Asp	Leu	
595					600					605						
agg	aaa	caa	gct	tga												1839
Arg	Lys	Gln	Ala													
610																
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Pro	Pro	Phe	Lys	Asp	Leu	Pro	Ser	Thr	Ser	Ser	Pro	Thr	Asn	Leu	Leu	
		20						25					30			
Pro	Leu	Arg	Lys	Thr	Ser	Ser	Asn	Thr	Ile	Thr	Cys	Ser	Leu	Gln		
		35						40			45					
Thr	Leu	His	Phe	Pro	Lys	Gln	Tyr	Gln	Pro	Thr	Ser	Thr	Ser	Thr	Ser	
		50					55			60						
Thr	Ala	Thr	Thr	Thr	Pro	Thr	Pro	Ile	Lys	Thr	Thr	Thr	Ile	Thr		
		65					70			75			80			
Thr	Thr	Thr	Pro	Pro	Arg	Glu	Thr	Asn	Pro	Leu	Ser	Asp	Thr	Asn	Gln	
					85					90			95			
Pro	Leu	Pro	Gln	Lys	Trp	Asn	Phe	Leu	Gln	Lys	Ala	Ala	Thr	Ala		
					100				105			110				
Leu	Asp	Leu	Val	Glu	Thr	Ala	Leu	Val	Ser	His	Glu	Arg	Lys	His	Pro	
					115				120			125				

Leu Pro Lys Thr Ala Asp Pro Arg Val Gln Ile Ala Gly Asn Phe Ala
 130 135 140
 Pro Val Pro Glu His Ala Ala Asp Gln Gly Leu Pro Val Val Gly Lys
 145 150 155 160
 Ile Pro Lys Cys Ile Asp Gly Val Tyr Val Arg Asn Gly Ala Asn Pro
 165 170 175
 Leu Tyr Glu Pro Val Ala Gly His Phe Phe Asp Gly Asp Gly Met
 180 185 190
 Val His Ala Val Lys Phe Thr Asn Gly Ala Ala Ser Tyr Ala Cys Arg
 195 200 205
 Phe Thr Glu Thr Gln Arg Leu Ser Gln Glu Lys Ser Leu Gly Arg Pro
 210 215 220
 Val Phe Pro Lys Ala Ile Gly Glu Leu His Gly His Ser Gly Ile Ala
 225 230 235 240
 Arg Leu Leu Leu Phe Tyr Ala Arg Gly Leu Phe Gly Leu Val Asp Gly
 245 250 255
 Ser Gln Gly Met Gly Val Ala Asn Ala Gly Leu Val Tyr Phe Asn Asn
 260 265 270
 His Leu Leu Ala Met Ser Glu Asp Asp Leu Pro Tyr His Val Arg Ile
 275 280 285
 Thr Pro Asn Gly Asp Leu Thr Thr Val Gly Arg Tyr Asp Phe Asn Gly
 290 295 300
 Gln Leu Asn Ser Thr Met Ile Ala His Pro Lys Leu Asp Pro Val Asp
 305 310 315 320
 Gly Asp Leu His Ala Leu Ser Tyr Asp Val Ile Gln Lys Pro Tyr Leu
 325 330 335
 Lys Tyr Phe Arg Phe Ser Pro Asp Gly Val Lys Ser Pro Asp Val Glu
 340 345 350
 Ile Pro Leu Lys Glu Pro Thr Met Met His Asp Phe Ala Ile Thr Glu
 355 360 365
 Asn Phe Val Val Val Pro Asp Gln Gln Val Val Phe Lys Leu Thr Glu
 370 375 380
 Met Ile Thr Gly Gly Ser Pro Val Val Tyr Asp Lys Asn Lys Thr Ser
 385 390 395 400
 Arg Phe Gly Ile Leu His Lys Asn Ala Lys Asp Ala Asn Ala Met Arg
 405 410 415
 Trp Ile Asp Ala Pro Asp Cys Phe Cys Phe His Leu Trp Asn Ala Trp
 420 425 430

Glu Glu Pro Glu Thr Glu Glu Val Val Val Ile Gly Ser Cys Met Thr
 435 440 445

Pro Ala Asp Ser Ile Phe Asn Glu Cys Glu Ser Leu Lys Ser Val
 450 455 460

Leu Ser Glu Ile Arg Leu Asn Leu Arg Thr Gly Lys Ser Thr Arg Arg
 465 470 475 480

Pro Ile Ile Ser Asp Ala Glu Gln Val Asn Leu Glu Ala Gly Met Val
 485 490 495

Asn Arg Asn Lys Leu Gly Arg Lys Thr Gln Phe Ala Tyr Leu Ala Leu
 500 505 510

Ala Glu Pro Trp Pro Lys Val Ser Gly Phe Ala Lys Val Asp Leu Leu
 515 520 525

Ser Gly Glu Val Lys Lys Tyr Met Tyr Gly Glu Glu Lys Phe Gly Gly
 530 535 540

Glu Pro Leu Phe Leu Pro Asn Gly Gln Lys Glu Asp Asp Gly Tyr Ile
 545 550 555 560

Leu Ala Phe Val His Asp Glu Lys Glu Trp Lys Ser Glu Leu Gln Ile
 565 570 575

Val Asn Ala Gln Asn Leu Lys Leu Glu Ala Ser Ile Lys Leu Pro Ser
 580 585 590

Arg Val Pro Tyr Gly Phe His Gly Thr Phe Ile His Ser Lys Asp Leu
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Arg Lys Gln Ala
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<211> 1815

<212> DNA

<213> Zea mays

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 Pro Ala Arg Ser Arg Ala Arg Ala Ser Asn Ser Val Arg Phe Ser Pro
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cgc gcc gtc agc tcc gtg ccc gcc gag tgc ctc cag gcg ccg ttc 144
 Arg Ala Val Ser Ser Val Pro Pro Ala Glu Cys Leu Gln Ala Pro Phe
 35 40 45

cac aag ccc gtc gcc gac ctg cct gcg ccg tcc agg aag ccc gcc gcc	192
His Lys Pro Val Ala Asp Leu Pro Ala Pro Ser Arg Lys Pro Ala Ala	
50 55 60	
att gcc gtc cca ggg cac gcc gcg ccg agg aaa gcg gag ggc ggc	240
Ile Ala Val Pro Gly His Ala Ala Ala Pro Arg Lys Ala Glu Gly Gly	
65 70 75 80	
aag aag cag ctc aac ttg ttc cag cgc gcc gcg gcc gcg ctc gac	288
Lys Lys Gln Leu Asn Leu Phe Gln Arg Ala Ala Ala Ala Leu Asp	
85 90 95	
gcg ttc gag gaa ggg ttc gtg gcc aac gtc ctc gag cgg ccc cac ggg	336
Ala Phe Glu Glu Gly Phe Val Ala Asn Val Leu Glu Arg Pro His Gly	
100 105 110	
ctg ccc acg acg gcc gac ccg gcc gtg cag atc gcc ggc aac ttc gcg	384
Leu Pro Ser Thr Ala Asp Pro Ala Val Gln Ile Ala Gly Asn Phe Ala	
115 120 125	
ccc gtc ggg gag agg ccg ccc gtg cac gag ctc ccc gtc tcc ggc cgc	432
Pro Val Gly Glu Arg Pro Pro Val His Glu Leu Pro Val Ser Gly Arg	
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atc ccg ccc ttc atc gac ggg gtc tac gcg cgc aac ggc gcc aac ccc	480
Ile Pro Pro Phe Ile Asp Gly Val Tyr Ala Arg Asn Gly Ala Asn Pro	
145 150 155 160	
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Cys Phe Asp Pro Val Ala Gly His His Leu Phe Asp Gly Asp Gly Met	
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Val His Ala Leu Arg Ile Arg Asn Gly Ala Ala Glu Ser Tyr Ala Cys	
180 185 190	
cgc ttc acg gag acc gcg cgc ctg cgc cag gag cgc gcg atc ggc cgc	624
Arg Phe Thr Glu Thr Ala Arg Leu Arg Gln Glu Arg Ala Ile Gly Arg	
195 200 205	
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Pro Val Phe Pro Lys Ala Ile Gly Glu Leu His Gly His Ser Gly Ile	
210 215 220	
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Ala Arg Leu Ala Leu Phe Tyr Ala Arg Ala Ala Cys Gly Leu Val Asp	
225 230 235 240	
ccc tcg gcc ggc acc ggc gtg gcc aac gcc ggc ctc gtc tac ttc aac	768
Pro Ser Ala Gly Thr Gly Val Ala Asn Ala Gly Leu Val Tyr Phe Asn	
245 250 255	
ggc cgc ctg ctc gcc atg tcc gag gac gac ctc ccc tac cac gtc cgc	816
Gly Arg Leu Leu Ala Met Ser Glu Asp Asp Leu Pro Tyr His Val Arg	
260 265 270	

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Val	Ala	Asp	Asp	Gly	Asp	Leu	Glu	Thr	Val	Gly	Arg	Tyr	Asp	Phe	Asp
275						280					285				
912															
ggg	cag	ctc	ggc	tgc	gcc	atg	atc	gac	cac	ccc	aag	ctg	gac	ccg	912
Gly	Gln	Leu	Gly	Cys	Ala	Met	Ile	Ala	His	Pro	Lys	Leu	Asp	Pro	Ala
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960															
acc	ggg	gag	ctc	cac	gac	ctc	agc	tac	gac	gtc	atc	aag	agg	ccg	960
Thr	Gly	Glu	Leu	His	Ala	Leu	Ser	Tyr	Asp	Val	Ile	Lys	Arg	Pro	Tyr
305						310				315			320		
1008															
ctc	aag	tac	ttc	tac	ttc	agg	ccc	gac	ggc	acc	aag	tcc	gac	gac	gtg
Leu	Lys	Tyr	Phe	Tyr	Phe	Arg	Pro	Asp	Gly	Thr	Lys	Ser	Asp	Asp	Val
325						330				335					
1056															
gag	atc	ccg	ctg	gag	cag	ccc	acg	atg	atc	cac	gac	ttc	gcc	atc	acc
Glu	Ile	Pro	Leu	Glu	Gln	Pro	Thr	Met	Ile	His	Asp	Phe	Ala	Ile	Thr
340						345					350				
1104															
gag	aac	ttc	gtg	gtt	gtg	ccc	gac	cac	cag	gtg	gtg	ttc	aag	ctc	cag
Glu	Asn	Phe	Val	Val	Val	Pro	Asp	His	Gln	Val	Val	Phe	Lys	Leu	Gln
355						360					365				
1152															
gag	atg	ctg	cgc	ggc	ggg	tcg	ccc	gtg	gtg	ctg	gac	aag	gag	aag	acg
Glu	Met	Leu	Arg	Gly	Gly	Ser	Pro	Val	Val	Leu	Asp	Lys	Glu	Lys	Thr
370						375					380				
1200															
tcg	cgg	ttc	ggc	gtg	ctc	ccc	aag	cac	gcc	gac	gac	tcg	gag	atg	
Ser	Arg	Phe	Gly	Val	Leu	Pro	Lys	His	Ala	Ala	Asp	Ala	Ser	Glu	Met
385						390				395			400		
1248															
gcg	tgg	gtg	gac	gtg	ccg	gac	tcg	ttc	tgc	ttc	cac	ctg	tgg	aac	gcg
Ala	Trp	Val	Asp	Val	Pro	Asp	Cys	Phe	Cys	Phe	His	Leu	Trp	Asn	Ala
405						410					415				
1296															
tgg	gag	gac	gag	gac	ggc	gag	gtg	gtg	atc	ggc	tcc	tgc	atg		
Trp	Glu	Asp	Glu	Ala	Thr	Gly	Glu	Val	Val	Val	Ile	Gly	Ser	Cys	Met
420						425					430				
1344															
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Thr	Pro	Ala	Asp	Ser	Ile	Phe	Asn	Glu	Ser	Asp	Glu	Arg	Leu	Glu	Ser
435						440					445				
1392															
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Val	Leu	Thr	Glu	Ile	Arg	Leu	Asp	Ala	Arg	Thr	Gly	Arg	Ser	Thr	Arg
450						455					460				
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cgc	gcc	gtc	ctg	ccg	ccg	tcg	cag	cag	gag	aac	ctg	gag	gtg	ggc	atg
Arg	Ala	Val	Leu	Pro	Pro	Ser	Gln	Gln	Glu	Asn	Leu	Glu	Val	Gly	Met
465						470					475			480	
1488															
gtg	aac	cgc	aac	ctg	ctg	ggc	cgc	gag	agc	cg	tac	gac	ttc	gac	
Val	Asn	Arg	Asn	Leu	Leu	Gly	Arg	Glu	Ser	Arg	Tyr	Ala	Tyr	Leu	Ala
485						490					495				

09/26/2019 10:22:00 AM

Pro Val Gly Glu Arg Pro Pro Val His Glu Leu Pro Val Ser Gly Arg
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 Ile Pro Pro Phe Ile Asp Gly Val Tyr Ala Arg Asn Gly Ala Asn Pro
 145 150 155 160
 Cys Phe Asp Pro Val Ala Gly His His Leu Phe Asp Gly Asp Gly Met
 165 170 175
 Val His Ala Leu Arg Ile Arg Asn Gly Ala Ala Glu Ser Tyr Ala Cys
 180 185 190
 Arg Phe Thr Glu Thr Ala Arg Leu Arg Gln Glu Arg Ala Ile Gly Arg
 195 200 205
 Pro Val Phe Pro Lys Ala Ile Gly Glu Leu His Gly His Ser Gly Ile
 210 215 220
 Ala Arg Leu Ala Leu Phe Tyr Ala Arg Ala Ala Cys Gly Leu Val Asp
 225 230 235 240
 Pro Ser Ala Gly Thr Gly Val Ala Asn Ala Gly Leu Val Tyr Phe Asn
 245 250 255
 Gly Arg Leu Leu Ala Met Ser Glu Asp Asp Leu Pro Tyr His Val Arg
 260 265 270
 Val Ala Asp Asp Gly Asp Leu Glu Thr Val Gly Arg Tyr Asp Phe Asp
 275 280 285
 Gly Gln Leu Gly Cys Ala Met Ile Ala His Pro Lys Leu Asp Pro Ala
 290 295 300
 Thr Gly Glu Leu His Ala Leu Ser Tyr Asp Val Ile Lys Arg Pro Tyr
 305 310 315 320
 Leu Lys Tyr Phe Tyr Phe Arg Pro Asp Gly Thr Lys Ser Asp Asp Val
 325 330 335
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 340 345 350
 Glu Asn Phe Val Val Val Pro Asp His Gln Val Val Phe Lys Leu Gln
 355 360 365
 Glu Met Leu Arg Gly Gly Ser Pro Val Val Leu Asp Lys Glu Lys Thr
 370 375 380
 Ser Arg Phe Gly Val Leu Pro Lys His Ala Ala Asp Ala Ser Glu Met
 385 390 395 400
 Ala Trp Val Asp Val Pro Asp Cys Phe Cys Phe His Leu Trp Asn Ala
 405 410 415
 Trp Glu Asp Glu Ala Thr Gly Glu Val Val Ile Gly Ser Cys Met
 420 425 430

Thr Pro Ala Asp Ser Ile Phe Asn Glu Ser Asp Glu Arg Leu Glu Ser
 435 440 445

Val Leu Thr Glu Ile Arg Leu Asp Ala Arg Thr Gly Arg Ser Thr Arg
 450 455 460

Arg Ala Val Leu Pro Pro Ser Gln Gln Glu Asn Leu Glu Val Gly Met
 465 470 475 480

Val Asn Arg Asn Leu Leu Gly Arg Glu Ser Arg Tyr Ala Tyr Leu Ala
 485 490 495

Val Ala Glu Pro Trp Pro Lys Glu Ser Gly Phe Ala Lys Glu Asp Leu
 500 505 510

Ser Thr Gly Glu Leu Thr Lys Phe Glu Tyr Gly Glu Gly Arg Phe Gly
 515 520 525

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 530 535 540

Gly Glu Asp Asp Gly Tyr Val Leu Thr Phe Val His Asp Glu Arg Ala
 545 550 555 560

Gly Thr Ser Glu Leu Leu Val Val Asn Ala Ala Asp Ile Arg Leu Glu
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<212> DNA

<213> Lycopersicon esculentum

<220>

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tct cta ctc aaa aat caa cat aat agg caa agt ctc aac att aat tcc 144
 Ser Leu Leu Lys Asn Gln His Asn Arg Gln Ser Leu Asn Ile Asn Ser
 35 40 45

tct ctt caa gct cca cct ata ctt cat ttt cct aaa caa tct tca aat	192
Ser Leu Gln Ala Pro Pro Ile Leu His Phe Pro Lys Gln Ser Ser Asn	
50 55 60	
tat caa aca cca aag aat aat aca att tca cac cca aaa caa gaa aac	240
Tyr Gln Thr Pro Lys Asn Asn Thr Ile Ser His Pro Lys Gln Glu Asn	
65 70 75 80	
aac aac tcc tct tct tca act tcc aag tgg aat tta gtg cag aaa	288
Asn Asn Ser Ser Ser Ser Thr Ser Lys Trp Asn Leu Val Gln Lys	
85 90 95	
gca gca gca atg gct tta gat gct gta gaa agt gct tta act aaa cat	336
Ala Ala Ala Met Ala Leu Asp Ala Val Glu Ser Ala Leu Thr Lys His	
100 105 110	
gaa ctt gaa cac cct ttg ccg aaa aca gcc gac cca cga gtc cag att	384
Glu Leu Glu His Pro Leu Pro Lys Thr Ala Asp Pro Arg Val Gln Ile	
115 120 125	
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Ser Gly Asn Phe Ala Pro Val Pro Glu Asn Pro Val Cys Gln Ser Leu	
130 135 140	
ccg gtc acc gga aaa ata ccc aaa tgt gtt caa ggc gtt tac gtt cga	480
Pro Val Thr Gly Lys Ile Pro Lys Cys Val Gln Gly Val Tyr Val Arg	
145 150 155 160	
aac gga gct aac cct ctt ttt gaa cca acc gcc gga cac cat ttc ttc	528
Asn Gly Ala Asn Pro Leu Phe Glu Pro Thr Ala Gly His His Phe Phe	
165 170 175	
gac ggc gac ggt atg gtt cac gcc gtt caa ttc aaa aat ggg tcg gct	576
Asp Gly Asp Gly Met Val His Ala Val Gln Phe Lys Asn Gly Ser Ala	
180 185 190	
agt tac gct tgc cgt ttc act gaa aca gag agg ctt gtt caa gaa aaa	624
Ser Tyr Ala Cys Arg Phe Thr Glu Thr Glu Arg Leu Val Gln Glu Lys	
195 200 205	
gct ttg ggt cgc cct gtt ttc cct aaa gcc att ggt gaa tta cat ggt	672
Ala Leu Gly Arg Pro Val Phe Pro Lys Ala Ile Gly Glu Leu His Gly	
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cac tct gga att gca agg ctt atg ctg ttt tac gct cgt ggg ctc ttc	720
His Ser Gly Ile Ala Arg Leu Met Leu Phe Tyr Ala Arg Gly Leu Phe	
225 230 235 240	
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Gly Leu Val Asp His Ser Lys Gly Thr Gly Val Ala Asn Ala Gly Leu	
245 250 255	
gtc tat ttc aat aac cga tta ctt gct atg tct gaa gat gat ttg cct	816
Val Tyr Phe Asn Asn Arg Leu Leu Ala Met Ser Glu Asp Asp Leu Pro	
260 265 270	

tac cat gta aag gta aca ccc acc ggc gat ctt aaa aca gag ggt cga	864
Tyr His Val Lys Val Thr Pro Thr Gly Asp Leu Lys Thr Glu Gly Arg	
275 280 285	
ttc gat ttc gac ggc cag cta aaa tcc acc atg ata gct cac cca aag	912
Phe Asp Phe Asp Gly Gln Leu Lys Ser Thr Met Ile Ala His Pro Lys	
290 295 300	
ctc gac cca gtt tcc ggt gag cta ttt gct ctt agc tac gat gtg att	960
Leu Asp Pro Val Ser Gly Glu Leu Phe Ala Leu Ser Tyr Asp Val Ile	
305 310 315 320	
cag aag cca tac ctc aag tac ttc aga ttt tca aaa aat ggg gaa aaa	1008
Gln Lys Pro Tyr Leu Lys Tyr Phe Arg Phe Ser Lys Asn Gly Glu Lys	
325 330 335	
tca aat gat gtt gaa att cca gtt gaa gac cca aca atg atg cat gat	1056
Ser Asn Asp Val Glu Ile Pro Val Glu Asp Pro Thr Met Met His Asp	
340 345 350	
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Phe Ala Ile Thr Glu Asn Phe Val Val Ile Pro Asp Gln Gln Val Val	
355 360 365	
ttc aag atg tct gaa atg atc cgt gga ggt tca ccg gtg gtt tac gac	1152
Phe Lys Met Ser Glu Met Ile Arg Gly Ser Pro Val Val Tyr Asp	
370 375 380	
aag aac aaa gtt tcc cga ttt ggt att ctg gat aag tac gcg aaa gat	1200
Lys Asn Lys Val Ser Arg Phe Gly Ile Leu Asp Lys Tyr Ala Lys Asp	
385 390 395 400	
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Gly Ser Asp Leu Lys Trp Val Glu Val Pro Asp Cys Phe Cys Phe His	
405 410 415	
ctc tgg aat gct tgg gaa gaa gca gaa aca gat gaa atc gtt gta att	1296
Leu Trp Asn Ala Trp Glu Glu Ala Glu Thr Asp Glu Ile Val Val Ile	
420 425 430	
ggg tca tgt atg aca cca cca gac tcc att ttc aat gaa tgt gat gaa	1344
Gly Ser Cys Met Thr Pro Pro Asp Ser Ile Phe Asn Glu Cys Asp Glu	
435 440 445	
ggg cta aag agt gtt tta tcc gaa atc cgt ctc aat ttg aaa aca ggg	1392
Gly Leu Lys Ser Val Leu Ser Glu Ile Arg Leu Asn Leu Lys Thr Gly	
450 455 460	
aaa tca aca aga aaa tcc ata atc gaa aac ccg gat gaa caa gtg aat	1440
Lys Ser Thr Arg Lys Ser Ile Ile Glu Asn Pro Asp Glu Gln Val Asn	
465 470 475 480	
tta gaa gct gga atg gtg aac cga aac aaa ctc gga agg aaa aca gag	1488
Leu Glu Ala Gly Met Val Asn Arg Asn Lys Leu Gly Arg Lys Thr Glu	
485 490 495	

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Tyr Ala Tyr Leu Ala Ile Ala Glu Pro Trp Pro Lys Val Ser Gly Phe	
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gca aaa gta aac ctg ttc acc ggt gaa gtt gag aaa ttc att tat ggt	1584
Ala Lys Val Asn Leu Phe Thr Gly Glu Val Glu Lys Phe Ile Tyr Gly	
515 520 525	
gac aac aaa tat ggt ggg gaa cct ctt ttt tta cca aga gac ccc aac	1632
Asp Asn Lys Tyr Gly Gly Glu Pro Leu Phe Leu Pro Arg Asp Pro Asn	
530 535 540	
agc aag gaa gaa gac gat ggt tat att tta gct ttc gtt cac gat gag	1680
Ser Lys Glu Glu Asp Asp Gly Tyr Ile Leu Ala Phe Val His Asp Glu	
545 550 555 560	
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Lys Glu Trp Lys Ser Glu Leu Gln Ile Val Asn Ala Met Ser Leu Lys	
565 570 575	
ttg gag gca act gtg aag ctt cca tca aga gtt cct tat gga ttt cat	1776
Leu Glu Ala Thr Val Lys Leu Pro Ser Arg Val Pro Tyr Gly Phe His	
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35 40 45	
Ser Leu Gln Ala Pro Pro Ile Leu His Phe Pro Lys Gln Ser Ser Asn	
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Tyr Gln Thr Pro Lys Asn Asn Thr Ile Ser His Pro Lys Gln Glu Asn	
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100 105 110	
Glu Leu Glu His Pro Leu Pro Lys Thr Ala Asp Pro Arg Val Gln Ile	
115 120 125	

Ser Gly Asn Phe Ala Pro Val Pro Glu Asn Pro Val Cys Gln Ser Leu
 130 135 140

Pro Val Thr Gly Lys Ile Pro Lys Cys Val Gln Gly Val Tyr Val Arg
 145 150 155 160

Asn Gly Ala Asn Pro Leu Phe Glu Pro Thr Ala Gly His His Phe Phe
 165 170 175

Asp Gly Asp Gly Met Val His Ala Val Gln Phe Lys Asn Gly Ser Ala
 180 185 190

Ser Tyr Ala Cys Arg Phe Thr Glu Thr Glu Arg Leu Val Gln Glu Lys
 195 200 205

Ala Leu Gly Arg Pro Val Phe Pro Lys Ala Ile Gly Glu Leu His Gly
 210 215 220

His Ser Gly Ile Ala Arg Leu Met Leu Phe Tyr Ala Arg Gly Leu Phe
 225 230 235 240

Gly Leu Val Asp His Ser Lys Gly Thr Gly Val Ala Asn Ala Gly Leu
 245 250 255

Val Tyr Phe Asn Asn Arg Leu Leu Ala Met Ser Glu Asp Asp Leu Pro
 260 265 270

Tyr His Val Lys Val Thr Pro Thr Gly Asp Leu Lys Thr Glu Gly Arg
 275 280 285

Phe Asp Phe Asp Gly Gln Leu Lys Ser Thr Met Ile Ala His Pro Lys
 290 295 300

Leu Asp Pro Val Ser Gly Glu Leu Phe Ala Leu Ser Tyr Asp Val Ile
 305 310 315 320

Gln Lys Pro Tyr Leu Lys Tyr Phe Arg Phe Ser Lys Asn Gly Glu Lys
 325 330 335

Ser Asn Asp Val Glu Ile Pro Val Glu Asp Pro Thr Met Met His Asp
 340 345 350

Phe Ala Ile Thr Glu Asn Phe Val Val Ile Pro Asp Gln Gln Val Val
 355 360 365

Phe Lys Met Ser Glu Met Ile Arg Gly Gly Ser Pro Val Val Tyr Asp
 370 375 380

Lys Asn Lys Val Ser Arg Phe Gly Ile Leu Asp Lys Tyr Ala Lys Asp
 385 390 395 400

Gly Ser Asp Leu Lys Trp Val Glu Val Pro Asp Cys Phe Cys Phe His
 405 410 415

Leu Trp Asn Ala Trp Glu Glu Ala Glu Thr Asp Glu Ile Val Val Ile
 420 425 430

Gly Ser Cys Met Thr Pro Pro Asp Ser Ile Phe Asn Glu Cys Asp Glu
 435 440 445

Gly Leu Lys Ser Val Leu Ser Glu Ile Arg Leu Asn Leu Lys Thr Gly
 450 455 460

Lys Ser Thr Arg Lys Ser Ile Ile Glu Asn Pro Asp Glu Gln Val Asn
 465 470 475 480

Leu Glu Ala Gly Met Val Asn Arg Asn Lys Leu Gly Arg Lys Thr Glu
 485 490 495

Tyr Ala Tyr Leu Ala Ile Ala Glu Pro Trp Pro Lys Val Ser Gly Phe
 500 505 510

Ala Lys Val Asn Leu Phe Thr Gly Glu Val Glu Lys Phe Ile Tyr Gly
 515 520 525

Asp Asn Lys Tyr Gly Glu Pro Leu Phe Leu Pro Arg Asp Pro Asn
 530 535 540

Ser Lys Glu Glu Asp Asp Gly Tyr Ile Leu Ala Phe Val His Asp Glu
 545 550 555 560

Lys Glu Trp Lys Ser Glu Leu Gln Ile Val Asn Ala Met Ser Leu Lys
 565 570 575

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<213> *Arabidopsis thaliana*

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aga	ccc	tcc	aag	ggg	ttc	tcc	tgc	aag	ctt	ctc	gat	ctt	ctc	gag	aga	96
Arg	Pro	Ser	Lys	Gly	Phe	Ser	Ser	Lys	Leu	Leu	Asp	Leu	Leu	Glu	Arg	
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ctt	gtc	gtc	aag	ctc	atg	cac	gat	gct	tct	cct	ctc	cac	tac	ctc	144
Leu	Val	Val	Lys	Leu	Met	His	Asp	Ala	Ser	Leu	Pro	Leu	His	Tyr	Leu
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tca	ggc	aac	ttc	gct	ccc	atc	cgt	gat	gaa	act	cct	ccc	gtc	aag	gat	192
Ser	Gly	Asn	Phe	Ala	Pro	Ile	Arg	Asp	Glu	Thr	Pro	Pro	Val	Lys	Asp	
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ctc	ccc	gtc	cat	gga	ttt	ctt	ccc	gaa	tgc	ttg	aat	ggt	gaa	ttt	gtg	240
Leu	Pro	Val	His	Gly	Phe	Leu	Pro	Glu	Cys	Leu	Asn	Gly	Glu	Phe	Val	
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agg	gtt	ggt	cca	aac	ccc	aag	ttt	gat	gct	gtc	gct	gga	tat	cac	tgg	288
Arg	Val	Gly	Pro	Asn	Pro	Lys	Phe	Asp	Ala	Val	Ala	Gly	Tyr	His	Trp	
						85			90				95			
ttt	gat	gga	gat	ggg	atg	att	cat	ggg	gta	cgc	atc	aaa	gat	ggg	aaa	336
Phe	Asp	Gly	Asp	Gly	Met	Ile	His	Gly	Val	Arg	Ile	Lys	Asp	Gly	Lys	
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gct	act	tat	gtt	tct	cga	tat	gtt	aag	aca	tca	cgt	ctt	aag	cag	gaa	384
Ala	Thr	Tyr	Val	Ser	Arg	Tyr	Val	Lys	Thr	Ser	Arg	Leu	Lys	Gln	Glu	
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gag	ttc	ttc	gga	gct	gcc	aaa	ttc	atg	aag	att	ggt	gac	ctt	aag	ggg	432
Glu	Phe	Phe	Gly	Ala	Ala	Lys	Phe	Met	Lys	Ile	Gly	Asp	Leu	Lys	Gly	
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ttt	ttc	gga	ttg	cta	atg	gtc	aat	atc	caa	cag	ctg	aga	acg	aag	ctc	480
Phe	Phe	Gly	Leu	Leu	Met	Val	Asn	Ile	Gln	Gln	Leu	Arg	Thr	Lys	Leu	
					145			150			155			160		
aaa	ata	ttg	gac	aac	act	tat	gga	aat	gga	act	gcc	aat	aca	gca	ctc	528
Lys	Ile	Leu	Asp	Asn	Thr	Tyr	Gly	Asn	Gly	Thr	Ala	Asn	Thr	Ala	Leu	
					165			170				175				
gta	tat	cac	cat	gga	aaa	ctt	cta	gca	tta	cag	gag	gca	gat	aag	ccg	576
Val	Tyr	His	His	Gly	Lys	Leu	Leu	Ala	Leu	Gln	Glu	Ala	Asp	Lys	Pro	
					180			185				190				
tac	gtc	atc	aaa	gtt	ttg	gaa	gat	gga	gac	ctg	caa	act	ctt	ggt	ata	624
Tyr	Val	Ile	Lys	Val	Leu	Glu	Asp	Gly	Asp	Leu	Gln	Thr	Leu	Gly	Ile	
					195			200			205					
ata	gat	tat	gac	aag	aga	ttg	acc	cac	tcc	ttc	act	gct	cac	cca	aaa	672
Ile	Asp	Tyr	Asp	Lys	Arg	Leu	Thr	His	Ser	Phe	Thr	Ala	His	Pro	Lys	
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gtt	gac	ccg	gtt	acg	ggt	gaa	atg	ttt	aca	ttc	ggc	tat	tcg	cat	acg	720
Val	Asp	Pro	Val	Thr	Gly	Glu	Met	Phe	Thr	Phe	Gly	Tyr	Ser	His	Thr	
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cca	cct	tat	ctc	aca	tac	aga	gtt	atc	tcg	aaa	gat	ggc	att	atg	cat	768
Pro	Pro	Tyr	Leu	Thr	Tyr	Arg	Val	Ile	Ser	Lys	Asp	Gly	Ile	Met	His	
					245			250			255					
gac	cca	gtc	cca	att	act	ata	tca	gag	cct	atc	atg	atg	cat	gat	ttt	816
Asp	Pro	Val	Pro	Ile	Thr	Ile	Ser	Glu	Pro	Ile	Met	Met	His	Asp	Phe	
					260			265			270					

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Thr Val Ile Asp Ala Lys Thr Met Ser Ala Glu Pro Val Ala Val Val	
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gag ctg ccg cac agg gtc cca tat ggc ttc cat gcc ttg ttt gtt aca	1584
Glu Leu Pro His Arg Val Pro Tyr Gly Phe His Ala Leu Phe Val Thr	
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35 40 45	
Ser Gly Asn Phe Ala Pro Ile Arg Asp Glu Thr Pro Pro Val Lys Asp	
50 55 60	
Leu Pro Val His Gly Phe Leu Pro Glu Cys Leu Asn Gly Glu Phe Val	
65 70 75 80	
Arg Val Gly Pro Asn Pro Lys Phe Asp Ala Val Ala Gly Tyr His Trp	
85 90 95	
Phe Asp Gly Asp Gly Met Ile His Gly Val Arg Ile Lys Asp Gly Lys	
100 105 110	
Ala Thr Tyr Val Ser Arg Tyr Val Lys Thr Ser Arg Leu Lys Gln Glu	
115 120 125	
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Phe Phe Gly Leu Leu Met Val Asn Ile Gln Gln Leu Arg Thr Lys Leu	
145 150 155 160	
Lys Ile Leu Asp Asn Thr Tyr Gly Asn Gly Thr Ala Asn Thr Ala Leu	
165 170 175	
Val Tyr His His Gly Lys Leu Leu Ala Leu Gln Glu Ala Asp Lys Pro	
180 185 190	
Tyr Val Ile Lys Val Leu Glu Asp Gly Asp Leu Gln Thr Leu Gly Ile	
195 200 205	

Ile Asp Tyr Asp Lys Arg Leu Thr His Ser Phe Thr Ala His Pro Lys
 210 215 220

Val Asp Pro Val Thr Gly Glu Met Phe Thr Phe Gly Tyr Ser His Thr
 225 230 235 240

Pro Pro Tyr Leu Thr Tyr Arg Val Ile Ser Lys Asp Gly Ile Met His
 245 250 255

Asp Pro Val Pro Ile Thr Ile Ser Glu Pro Ile Met Met His Asp Phe
 260 265 270

Ala Ile Thr Glu Thr Tyr Ala Ile Phe Met Asp Leu Pro Met His Phe
 275 280 285

Arg Pro Lys Glu Met Val Lys Glu Lys Lys Met Ile Tyr Ser Phe Asp
 290 295 300

Pro Thr Lys Lys Ala Arg Phe Gly Val Leu Pro Arg Tyr Ala Lys Asp
 305 310 315 320

Glu Leu Met Ile Arg Trp Phe Glu Leu Pro Asn Cys Phe Ile Phe His
 325 330 335

Asn Ala Asn Ala Trp Glu Glu Asp Glu Val Val Leu Ile Thr Cys
 340 345 350

Arg Leu Glu Asn Pro Asp Leu Asp Met Val Ser Gly Lys Val Lys Glu
 355 360 365

Lys Leu Glu Asn Phe Gly Asn Glu Leu Tyr Glu Met Arg Phe Asn Met
 370 375 380

Lys Thr Gly Ser Ala Ser Gln Lys Lys Leu Ser Ala Ser Ala Val Asp
 385 390 395 400

Phe Pro Arg Ile Asn Glu Cys Tyr Thr Gly Lys Lys Gln Arg Tyr Val
 405 410 415

Tyr Gly Thr Ile Leu Asp Ser Ile Ala Lys Val Thr Gly Ile Ile Lys
 420 425 430

Phe Asp Leu His Ala Glu Ala Glu Thr Gly Lys Arg Met Leu Glu Val
 435 440 445

Gly Gly Asn Ile Lys Gly Ile Tyr Asp Leu Gly Glu Gly Arg Tyr Gly
 450 455 460

Ser Glu Ala Ile Tyr Val Pro Arg Glu Thr Ala Glu Glu Asp Asp Gly
 465 470 475 480

Tyr Leu Ile Phe Phe Val His Asp Glu Asn Thr Gly Lys Ser Cys Val
 485 490 495

Thr Val Ile Asp Ala Lys Thr Met Ser Ala Glu Pro Val Ala Val Val
 500 505 510

Glu Leu Pro His Arg Val Pro Tyr Gly Phe His Ala Leu Phe Val Thr
 515 520 525

Glu Glu Gln Leu Gln Glu Gln Thr Leu Ile
 530 535

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<220>
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27

<210> 20
 <211> 31
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<220>
 <223> Description of Artificial Sequence: Primer

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31

<210> 21
 <211> 38
 <212> DNA
 <213> Artificial Sequence

<220>
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38

<210> 22
 <211> 36
 <212> DNA
 <213> Artificial Sequence

<220>
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36

<210> 23
 <211> 29
 <212> DNA

<213> Artificial Sequence
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 <223> Description of Artificial Sequence: Primer
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<210> 24
 <211> 31
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 <213> Artificial Sequence
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 <223> Description of Artificial Sequence: Primer
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<210> 25
 <211> 33
 <212> DNA
 <213> Artificial Sequence
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 <223> Description of Artificial Sequence: Primer
 <400> 25
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<210> 26
 <211> 34
 <212> DNA
 <213> Artificial Sequence
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 <223> Description of Artificial Sequence: Primer
 <400> 26
 attgaattct taaagcttat taaggtcact ttcc 34

<210> 27
 <211> 35
 <212> DNA
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<210> 28
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<213> Artificial Sequence

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<400> 28
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<210> 29
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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 29
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<210> 30
<211> 40
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

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<210> 31
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 31
attgaattca tggcttcttt cacggcaacg gc 32

<210> 32
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 32
gttttccag tcacgac 17

<210> 33
 <211> 538
 <212> PRT
 <213> Arabidopsis thaliana

<400> 33
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 Arg Pro Ser Lys Gly Phe Ser Ser Lys Leu Leu Asp Leu Leu Glu Arg
 20 25 30
 Leu Val Val Lys Leu Met His Asp Ala Ser Leu Pro Leu His Tyr Leu
 35 40 45
 Ser Gly Asn Phe Ala Pro Ile Arg Asp Glu Thr Pro Pro Val Lys Asp
 50 55 60
 Leu Pro Val His Gly Phe Leu Pro Glu Cys Leu Asn Gly Glu Phe Val
 65 70 75 80
 Arg Val Gly Pro Asn Pro Lys Phe Asp Ala Val Ala Gly Tyr His Trp
 85 90 95
 Phe Asp Gly Asp Gly Met Ile His Gly Val Arg Ile Lys Asp Gly Lys
 100 105 110
 Ala Thr Tyr Val Ser Arg Tyr Val Lys Thr Ser Arg Leu Lys Gln Glu
 115 120 125
 Glu Phe Phe Gly Ala Ala Lys Phe Met Lys Ile Gly Asp Leu Lys Gly
 130 135 140
 Phe Phe Gly Leu Leu Met Val Asn Val Gln Gln Leu Arg Thr Lys Leu
 145 150 155 160
 Lys Ile Leu Asp Asn Thr Tyr Gly Asn Gly Thr Ala Asn Thr Ala Leu
 165 170 175
 Val Tyr His His Gly Lys Leu Leu Ala Leu Gln Glu Ala Asp Lys Pro
 180 185 190
 Tyr Val Ile Lys Val Leu Glu Asp Gly Asp Leu Gln Thr Leu Gly Ile
 195 200 205
 Ile Asp Tyr Asp Lys Arg Leu Thr His Ser Phe Thr Ala His Pro Lys
 210 215 220
 Val Asp Pro Val Thr Gly Glu Met Phe Thr Phe Gly Tyr Ser His Thr
 225 230 235 240
 Pro Pro Tyr Leu Thr Tyr Arg Val Ile Ser Lys Asp Gly Ile Met His
 245 250 255
 Asp Pro Val Pro Ile Thr Ile Ser Glu Pro Ile Met Met His Asp Phe
 260 265 270

Ala Ile Thr Glu Thr Tyr Ala Ile Phe Met Asp Leu Pro Met His Phe
 275 280 285
 Arg Pro Lys Glu Met Val Lys Glu Lys Lys Met Ile Tyr Ser Phe Asp
 290 295 300
 Pro Thr Lys Lys Ala Arg Phe Gly Val Leu Pro Arg Tyr Ala Lys Asp
 305 310 315 320
 Glu Leu Met Ile Arg Trp Phe Glu Leu Pro Asn Cys Phe Ile Phe His
 325 330 335
 Asn Ala Asn Ala Trp Glu Glu Asp Glu Val Val Leu Ile Thr Cys
 340 345 350
 Arg Leu Glu Asn Pro Asp Leu Asp Met Val Ser Gly Lys Val Lys Glu
 355 360 365
 Lys Leu Glu Asn Phe Gly Asn Glu Leu Tyr Glu Met Arg Phe Asn Met
 370 375 380
 Lys Thr Gly Ser Ala Ser Gln Lys Lys Leu Ser Ala Ser Ala Val Asp
 385 390 395 400
 Phe Pro Arg Ile Asn Glu Cys Tyr Thr Gly Lys Lys Gln Arg Tyr Val
 405 410 415
 Tyr Gly Thr Ile Leu Asp Ser Ile Ala Lys Val Thr Gly Ile Ile Lys
 420 425 430
 Phe Asp Leu His Ala Glu Ala Glu Thr Gly Lys Arg Met Leu Glu Val
 435 440 445
 Gly Gly Asn Ile Lys Gly Ile Tyr Asp Leu Gly Glu Gly Arg Tyr Gly
 450 455 460
 Ser Glu Ala Ile Tyr Val Pro Arg Glu Thr Ala Glu Glu Asp Asp Gly
 465 470 475 480
 Tyr Leu Ile Phe Phe Val His Asp Glu Asn Thr Gly Lys Ser Cys Val
 485 490 495
 Thr Val Ile Asp Ala Lys Thr Met Ser Ala Glu Pro Val Ala Val Val
 500 505 510
 Glu Leu Pro His Arg Val Pro Tyr Gly Phe His Ala Leu Phe Val Thr
 515 520 525
 Glu Glu Gln Leu Gln Glu Gln Thr Leu Ile
 530 535